

Systems of Linear Equations: one solution, no solution, or infinitely many solutions

1. A system has ONE solution when the two lines are graphed and intersect at one point. The lines will have different slopes.
2. A system has NO SOLUTIONS when the two lines are parallel which means they will have the same slope but different y-intercept. When solving algebraically the solution looks similar to $0 = -3$ which is a false statement.
3. A system has INFINITELY MANY SOLUTIONS when the two lines are exactly the same on the graph. This means they have the same slope AND y-intercept. When solving algebraically the solution will be $0 = 0$ which is a true statement.

*Use the short cuts to identify the slope & y-int OR Elimination to see if you get a true or false statement.

Ex: Determine how many solution the system has.

$$\begin{array}{rcl} -2(7x - 4y = 13) & \rightarrow & -14x + 8y = -26 \\ 14x - 8y = 10 & \rightarrow & \underline{14x - 8y = 10} \\ & & 0 = -16 \end{array}$$

The variables get eliminated
and a false statement of
 $0 = -16$ means NO
Solution.